

Diseases of thymus

Hyperplasia	Thymoma	T-cell Lymphoma
Associated with <u>Myasthenia gravis</u>	Associated with <u>Myasthenia gravis</u>	--
Hyperplasia of <u>lymphoid follicles</u> 	<u>Epithelial</u> tumor -Benign -Malignant (invasive) Type I: Benign looking Type II: <u>Squamous</u> cell carcinoma	Malignant <u>T cells</u>

Blood Diseases

Anemia

Decreased quantity of RBCs or Hgb in a unit volume of blood , with or without decreased blood volume

1. Deficiency

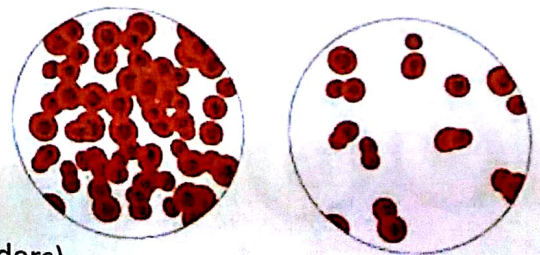
- a. Iron deficiency
Decreased intake or absorption – chronic loss (piles, ulcers, Anklystoma)
- b. Megaloblastic (B12 or Folic acid deficiency)
Decreased intake (pregnancy) - decreased absorption (lack of intrinsic factor in gastric diseases, or intestinal malabsorption) – chronic Liver disease (Cirrhosis)

2. Haemolytic

- a. Intracorpouscular
Hereditary spherocytosis – Haemoglobinopathy (Sickle cell, Thalassaemia) – G6PD
- b. Extracorpouscular
Autoantibodies (Hodgkin , SLE) - Iso Ab (Erythroblastosis fetalis) – Infections (Cl. Welchii , hem. Strept, Malaria) – Poisons (e.g.snake venom, Arsenic)

3. Blood Loss

- a. Acute (post haemorrhagic)
- b. Chronic (Tumors, Ulcers, Bleeding disorders)



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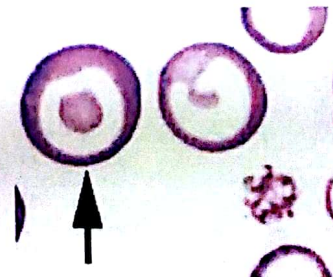
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4. Bone marrow hypofunction

- a. **Aplastic** : B.M. **aplasia** with decreased RBCs, WBCs & platelets
1ry: Idiopathic (unknown cause)
2ry: Idiosyncrasy (hypersensitivity to drugs e.g. Sulphonamides) - Radiation
- b. **Leuko-Erythroblastic (Myelophthisic)**
 B.M. is **replaced** by **Metastasis**, Lipid storage, or Myelosclerosis

Pathological effects of Anemia

	Iron deficiency	Megaloblastic	Haemolytic
Pathological	-Cardiac : Tachycardia -Skin & m.m : Pallor -Liver : Fatty chnges -B.M. : Hyperplasia ----- -Oral : Angular Stomatitis -Fingers : Spoon , brittle nails -Spleen : Splenomegaly ----- In Plummer Vinson syndrome Glossitis – Stomatitis – Dysphagia (a precancerous lesion of post-cricoid carcinoma)	-Cardiac : Tachycardia -Skin & m.m : Pallor -Liver : Fatty chnges -B.M. : Hyperplasia ----- -Subacute combined deg. of spinal cord (B12) -Splenomegaly & hepatomegaly (due to extramedullary hematopoiesis & haemosidrosis) ----- In Pernicious (Addison) anemia Autoimmune gastritis or genetic dysfunction of parietal cells (familial, Blood group A)	-Cardiac : Tachycardia -Skin & m.m : Pallor -Liver : Fatty chnges -B.M. : Hyperplasia ----- -Stones in G.B -Splenomegaly & hepatomegaly (due to extramedullary hematopoiesis & haemosidrosis)
Hematologic	Microcytic Hypochromic anemia	-Macrocytic , normochromic -Anisocytosis : variable size -Poikilocytosis : variable shape	Sickle cell : Sickling of Hb-S Thalassemia : Hb-F Microcytic, Hypochromic, thin (leptocyte), with central thickness (target cell), fragile



Pathogenesis of Haemolytic anaemia

Herditary Spherocytosis: Autosomal dominant → membrane Permeable to sodium

Sickle cell: Herditary Hb-S → Sickling due to insolubility (increased with hypoxia)

Thalassemia(Mediterranean or Cooley's)anemia: Herditary Impairment of B-chain Globin
→ Hb-F (fetal Hb)

Erythroblastosis Fetalis: Rh +ve infants of Rh -ve mothers → Sensitization in mother → In
2nd pregnancy Ab will attack the RBCs of Rh +ve child

G6PD deficiency (favism): drugs (e.g. sulpha, Aspirin) , or Fava beans → haemolysis

Hematological classification of Anemia

Microcytic (Iron , Thalassemia) – **Macrocytic** (megaloblastic) - **Normocytic** (Haemorrhagic,
B.M. hypofunction)

Polycythemia

Increased number of RBCs in a unit volume of blood , with increased blood volume

Types & causes

- **1ry** (Polycythemia rubra vera): **Neoplastic** disease of B.M.
Increased RBCs >10 million/cc , Leukocytosis , & Thrombocytosis
- **Pathological findings:**
 - Venous obstruction → **Cyanosis** - **Thrombosis** – Hemorrhage
 - Splenomegaly & Hepatomegaly (Active hematopoiesis)
 - Peptic **ulcers** (vascular thrombosis)
 - Chronic **myeloid Leukemia** & myelosclerosis may develop
- **2ry** : Hypoxia (e.g. cardio-pulm. diseases) – Renal diseases (e.g. RCC)



Diseases of WBCs

Neutrophilia	1ry polycythemia Acute Infections (e.g. Pyogenic, Fungi) <u>Acidosis</u>
Lymphocytosis	Acute infections (Whooping cough) Chronic infections (TB, Syphilis) Viral (e.g. IMN)
Eosinophilia	Parasites - Allergy
Agranulocytosis & neutropenia Less than 2000/cc	- Hypofunction of B.M. - Hypersplensim - Infections (e.g. Typhoid, TB) - Intoxication (e.g. Cocaine, benzene) ----- leads to → lowered immunity → Severe <u>infections</u> → ulcerated mucosa (Agranulocytic angina)

Leukemia

Malignant proliferation of WBC's in bone marrow, leading to ↑ count & immature cells in peripheral blood and tissue.

Aleukaemic leukemia: **normal count** + immature forms in the peripheral blood .

Causes: **Viruses.** , **benzene.** , **radiation.** , **Chromosomal**

Acute leukaemia:

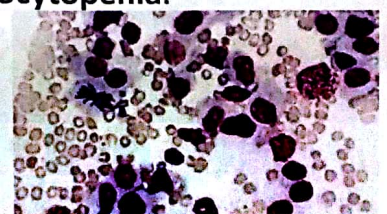
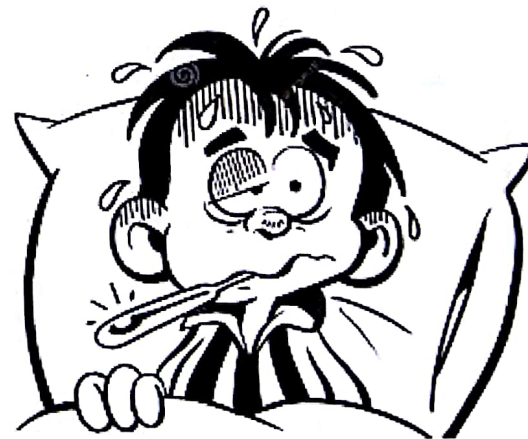
In **Young age & children** ,rapid and fulminating course.

Clinical findings:

1. high remittent **fever**
2. necrosis in **mouth** and throat
3. rapid **anaemia**
4. **bleeding**
5. enlargement of **lymph nodes**, **HSM**.

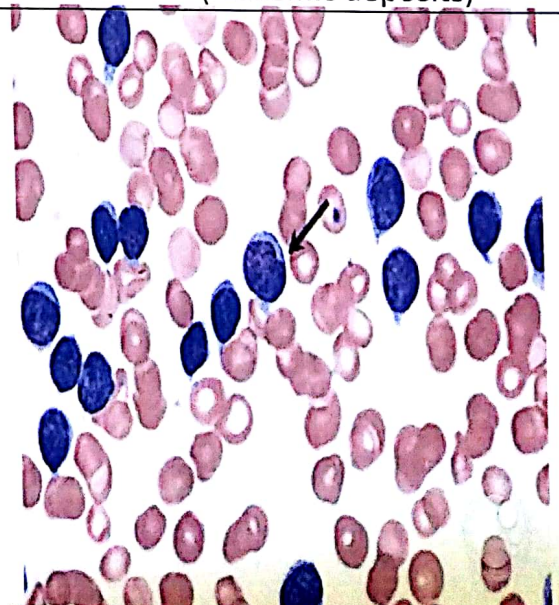
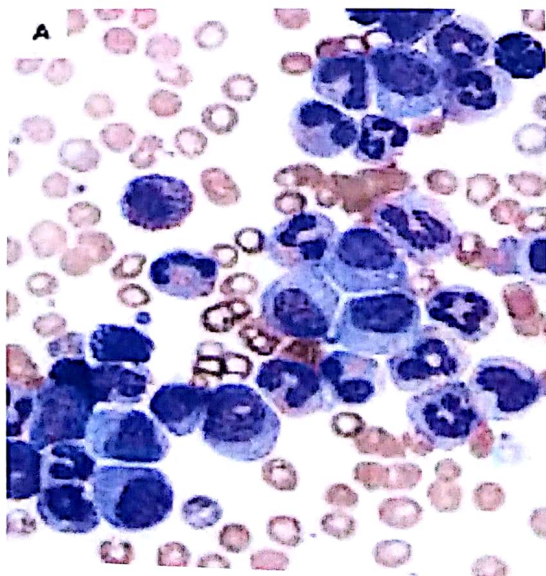
Haematological findings:

- WBC's: **100,000/mm²**. Mostly: immature (**blast cells**)
- Marked normocytic, normochromic **anaemia**, **Thrombocytopenia**.



Chronic leukaemia:

	Chronic Myeloid Leukemia "CML"	Chronic Lymphocytic "CLL"
incidence	Common	Less
Age	25 – 40 yr	40 – 60yr.
Hematological	WBC's up to 800.000/mm² - myelocytes & <u>metamyelocytes</u> - Granulocytes & their <u>precursor</u>. - <u>Anaemia</u> (normo) (d.t haemolysis or inadequacy of Bone marrow). - <u>Thrombocytopenia</u>. - Bone marrow <u>hypercellular</u> +blasts	20.000 – 250.000/mm² - <u>lymphocytes</u> (90%) - lymphoblasts
Fate	Rapidly fatal (1-5 years) Acute exacerbation (sudden attacks)	Slow course (10 years) Recurrent infection
Spleen	- Large, with <u>infarctions</u> (thrombi) - Red pulp is infiltrated by leukemic cells - White pulp is atrophic - Myeloid metaplasia	- Mild enlargement - Red pulp is infiltrated - White pulp: proliferated follicles
Liver	- Large - Leukemic cells in <u>portal tracts</u> & <u>sinusoids</u>	- Large - Leukemic cells in <u>portal tracts</u> & <u>sinusoids</u>
L.N.	Late affection	- Marked generalized Lymphadenopathy - Infiltrated by lymphocytes
Other complications	- Complications of <u>anemia</u> - Frequent <u>infections</u> - <u>Bleeding</u> tendency - Skin nodules (leukemic deposits)	- Complications of <u>anemia</u> - Frequent <u>infections</u> - <u>Bleeding</u> tendency - Skin nodules (leukemic deposits)



Hemorrhagic diseases

- **Platelet Abnormality** (Thrombocytopenic purpura)
 - **1ry (ITP)** : more in children, unknown cause, Autoimmune or hypersplensim
 - **2ry**: Leukemia, B.M. depression, chemicals, ionizing radiation
- **Vascular damage**
 - **Allergic** vasculitis (Henoch-Schonline) : rare diffuse vasculitis → purpura , hematuria, & GIT bleeding
 - **Scurvy** : vitamin C deficiency → Inadequate collagen → bleeding gums
 - **Infections** (e.g. septicemia)
- **Clotting factors defect**
 - **Hemophilia** : X-linked recessive , low **factor VIII** (Hemophilia A)
 - **Christmas** dis: X-linked recessive, **factor IX** (Hemophilia B)
 - **Hypoprothrombinemia** : **Autosomal recessive** or acquired **vitamin K** deficiency (in Malabsorption & liver diseases)

C/P of hemorrhagic diseases:

- Prolonged bleeding time or clotting time
- Skin **pupura** & urticaria
- Bleeding from mucous membranes
- external bleeding (e.g. epistaxis , menorrhagia, Hematurea)
- Internal bleeding (e.g. Hemarthrosis following trauma → fibrous adhesions)



1-A 50- years-old by picture of right leg edema and sudden severe pain.

Doppler's test revealed presence of thrombi in right lower limb vessels. On examination, generalized lymphadenopathy was identified. Cervical lymph node biopsy revealed lost architecture with diffuse infiltration by small lymphocytes with plasmacytoid differentiation.

- What the most probable diagnosis?
- Can you expect the cause of this leg condition?

2-A-48-years-old man presents to outpatient clinic, complaining of generalized weakness, weight loss and low grade fever of 6 months duration. On examination, cervical, axillary and inguinal lymph nodes were seen enlarged. FNA from cervical lymph node revealed scattered eosinophils, plasma cells and single large cell with bilobed nucleus and large nucleoli.

- What is your diagnosis?
- Mention other microscopic subtypes of this disease?
- What is the investigation that should be performed before staging?
- Mention immunohistochemistry of the large cells.
- What are the gross features of the involved lymph nodes?

3-A-20-year-old man from western countries presents with an ileocecal mass without any nodal affection. Further evaluation of the excessive mass reveals a type of lymphoma formed of uniform tumor cells, having rounded or oval nuclei 2-3 nucleoli and a rim of dense cytoplasm. Mitotic figures are numerous with evidence of necrosis.

- What is the most likely diagnosis?
- What is the pattern seen?
- What is the cell of origin of this neoplasm?
- If this disorder affects an African boy, what will be the site of the lesion?

4-A-28-years-old woman presents by enlarged posterior cervical lymph nodes and history of repeated abortions. FNA from these lymph nodes reveals clusters of epithelioid cells.

- What is the most probable diagnosis?
- How to confirm this diagnosis?
- Mention other 2 examples for the presence of epithelioid cells in lymph nodes.
- How to differentiate between the later 2 conditions microscopically?

5-A lymph node biopsy from a 60-years-old man was done. He presents with peripheral lymphocytosis and generalized lymphadenopathy. Sections examined reveal complete effacement of architecture by diffuse monotonous population of small lymphocytes with round hyperchromatic nuclei and rare mitotic figures.

- What is the most likely diagnosis?
- What is the prognosis of this case?
- What is the expected clinical picture?

6-A 10-years-old boy presents with enlarged axillary lymph nodes and mild fever. Excisional biopsy reveals stellate microabscess.

- What is the most likely diagnosis?
- What is the underlying causative agent?
- What is the advice to the mother?

**7-A patient presented with enlarged cervical lymph nodes. Biopsy examination showed granulomas formed of epithelioid cells, multinucleated giant cells and central caseation
What is the most possible diagnosis?**

- What are complications of the disease in lymph nodes?
- If no caseation is present, what is the most possible second differential diagnosis? How to differentiate between them?
- Mention other causes of lymph node enlargement?

8-A 32-year-old man presents with mild intermittent fever, loss of weight and itching. Examination revealed painless enlargement of lymph nodes. LN biopsy revealed a nodular pattern of growth separated by broad fibrous bands.

- What is the most likely diagnosis?
- Describe the variants of the pathognomonic cell in this disease.
- What is the prognosis of this variant?

10-A 7-year-old boy living in central Africa presents with rapidly enlarging mass in his mandible. No cervical LN enlargement. Histologic sections reveal starry-sky appearance

- a- What is the most likely diagnosis.
- b- What is the cell of origin and the predisposing factor?
- c- Explain the starry-sky appearance.
- d- what are the possible sites of this lesion in western countries patients.

11-A 49-year-old woman has experienced increasing weakness and chest pain over the past 6 months. On physical examination, she is afebrile. Motor strength is 5/5 in all extremities, but diminishes to 4/5 with repetitive movements. A Chest Ct showed an irregular large mass in anterior mediastinum. Microscopically, the mass is composed of large, anaplastic epithelial cells mixed with lymphoid cells.

- What is your diagnosis?
- Mention other microscopic types of this disease?

12-An old man presented with generalized lymph node enlargement. Biopsy examination showed diffuse infiltration of the lymph node by malignant large lymphocytes.

- What is your diagnosis?
- Mention immunohistochemistry of these large lymphocytes
- Enumerate other 3 types of this type of disease.

13-A 54 old male with cirrhosis presents with enlarged spleen. Then he suffers an attack of haematemesis. After performing a CBC the doctor recommended splenectomy.

- What is the most likely diagnosis?
- Why did the dr recommend splenectomy?
- What are the other causes that may lead to the same condition?

-Describe the microscopic pic of this lesion.

14-A 32 year old man presents with mild intermittent fever, loss of weight and itching. Examination revealed painless enlargement of lymph nodes. LN biopsy revealed a nodular pattern of growth separated by broad fibrous bands.

-What is the most likely diagnosis?

-Describe the variants of the pathognomonic cell in this disease.

-What is the prognosis of this variant?

15-A 7-year-old boy has complained of worsening pain in right side of the neck for the past week. On examination, there were multiple painful swollen right cervical lymph nodes. Examination of lymph node biopsy revealed acute inflammatory reaction rich in neutrophils. The most possible diagnosis is

a-Sarcoidosis

b-Follicular lymphoma.

c-Cat -scratch disease.

d-Acute non-specific lymphadenitis.

16-A patient presents with sore throat, mild fever, cervical lymphadenopathy

and splenomegaly. Biopsy reveals partial loss of nodal architecture, focal necrosis, diffuse proliferation of B cells with numerous immunoblasts. Which of the following is the most likely diagnosis?

A-Cat scratch.

B- Infectious mononucleosis

C- Tuberculosis.

D- Hodgkin's lymphoma.

17-60 years male complains of skin erythematous lesions Examination reveals infiltration of the skin by neoplastic lymphoid CD 3+cells. The most likely diagnosis is?

a-Small lymphocytic lymphoma

b- Diffuse large cell lymphoma.

c- Mycosis fungoides.

d- Plasmacytic lymphoma.

e- Nodular sclerosis HD.

18-A 60 year old male presents with enlarged supraclavicular LNs.

Biopsy

reveals effacement of nodal architecture by numerous nodules of uniform size made up of predominantly of large neoplastic lymphoid cells with numerous mitotic figures. No tangible body macrophages are present. Which of the following is the most likely diagnosis.

- A- Diffuse large cell lymphoma.
- B- Follicular small and large cell lymphoma.
- C- Follicular large cell lymphoma.
- D- Lymphoblastic lymphoma

19-A 20 years mal has an enlarged cervical lymph node which on examination reveal granulomatous reaction. Which of the following diseases does not cause such a reaction?

- a- TB lymphadenitis.
- B- Sarcoidosis.
- C-Toxoplasmosis
- d-Cat scratch disease.
- e-Infectious mononucleosis.

20-The predominant R.S cell type in nodular sclerosis subtype of hodgkin's lymphoma is:

- A. Classic.
- B. Pop corn.
- C. Pleomorphic.
- D. Lacunar.
- E. Mononuclear

21-Staging of Hodgkin's lymphoma depends on:

- A-Type of Hodgkin's cell.
- B-Number of involved lymph nodes.
- C- Number of involved groups of lymph nodes.
- D-Site of involved groups of lymph nodes.
- E- Number and site of involved groups of lymph nodes